2011 CTPP TAZ Delineation Process

TNMUG
March 4, 2011

Bristol Metropolitan Planning Organization
DISCLAIMER

- Neither Mike nor David claim to be authorities on the CTPP or other Census products.
- This information was primarily gleaned from internet research, other presentations and posts to the CTPP list-serve and believed to be accurate as of the current date, but use at your own risk! Beware of the pitfalls!
Presentation Objective: To provide some guidance on the delineation of TAZs for the CTPP package
Project Outcome: The delineation of TAZs and TADs - the firm foundations of transportation planning
Census Transportation Planning Package – What’s Available Now?

- Transportation Profiles
- CTPP Data Based on 2006-2008 ACS Products
- CTPP Data Based on 2000 Census
Census Transportation Planning Package – What’s Available Now?

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Transportation Profiles

- **Part 1 Profile 1** has the following tables:
  - Total Persons, Persons in Households, Total Households, Average Household Size, Average Vehicles per Households, Persons in Group Quarters, Total Workers and Workers at Work, Mode to Work (including collapsed version), Travel Time to Work, Departure Time to Work and Mean Travel Time by Mode to Work.

- **Part 1 Profile 2** has the following tables:
  - Vehicles available in Household, Mode to Work by Poverty Status, Mode to Work by Vehicles available, Household size by Vehicles available, Vehicles available by Workers in Household, Persons in Household by Workers in Household, Household Income in Household.

- **Part 1 Profile 3** has two tables:
  - Mode to Work by Travel Time and Mode to Work by Time Leaving Home.

- **Part 2 Profile 1** has the following tables:
  - Total Workers, Total Workers Excluding Home-based Workers, Mean Travel Time to work, Average Vehicle Occupancy, Average Carpool size and Workers in Group Quarters, Total Workers by Sex, Mode to Work, Total Workers by Industry, Travel Time to Work and Arrival Time to Work.

- **Part 2 Profile 2** has one table:
  - Mode to Work by Industry.

http://ctpp.transportation.org
### Transportation Profile Example


**Geographic Area:** Knoxville city, TN  
**FIPS:** 04740000

#### R13. Mode to Work by Travel Time

<table>
<thead>
<tr>
<th></th>
<th>Total</th>
<th>Less than 10 minutes</th>
<th>10-19 minutes</th>
<th>20-29 minutes</th>
<th>30 to 44 minutes</th>
<th>45-69 minutes</th>
<th>60 or more minutes</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>Number</td>
<td>MOE(±1)</td>
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<td>MOE(±1)</td>
<td>Number</td>
<td>MOE(±1)</td>
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<tr>
<td>Total Workers</td>
<td>77,960</td>
<td>1,694</td>
<td>19,483</td>
<td>1,093</td>
<td>9,266</td>
<td>1,645</td>
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#### CTPP2060

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#### R14. Mode to Work by Time Leaving Home

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<tr>
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<th>Total</th>
<th>6:00-6:29 a.m.</th>
<th>6:30-7:29 a.m.</th>
<th>7:30-8:29 a.m.</th>
<th>8:30-9:59 a.m.</th>
<th>10:00 a.m.-5:59 p.m.</th>
<th>6:00 p.m.-4:49 a.m.</th>
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<tr>
<td></td>
<td>Number</td>
<td>MOE(±1)</td>
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<tr>
<td>Drive alone</td>
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<td>6,168</td>
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<td>77</td>
<td>79</td>
<td>183</td>
<td>112</td>
<td>293</td>
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<tr>
<td>Taxi cab, motorcycle, bicycle, walk and other means</td>
<td>4,349</td>
<td>523</td>
<td>135</td>
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<td>453</td>
<td>196</td>
<td>578</td>
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#### CTPP2060

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<tr>
<td>Drive alone</td>
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<td>Public transportation</td>
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<td>318</td>
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<td>379</td>
<td>123</td>
<td>435</td>
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</table>

**Notes:**
1. CTPP2000 Table T-022 and 2005-2007 ACS Table C08134
2. CTPP2060 Table T-051 and 2006-2007 ACS Table B05133
Census Transportation Planning Package – What’s Available Now?

- Transportation Profiles
- CTPP Data Based on 2006-2008 ACS Products
- CTPP Data Based on 2000 Census
2006-2008 American Community Survey
CTPP Products

- County-to-County and Place-to-Place Flows by Mode
  - or Download Matrices for TransCAD from Caliper User Center

- Workplace and Residence data is available only for areas with population 20,000 or greater

- Data Access Tool Available
Census Transportation Planning Package – What’s Coming?

- CTPP based on 5-year ACS Data (2006 – 2010)
- Involves Delineating new TAZs and TADs (if you desire)
- TAZ and TAD delineation will need to observe certain rules (some recommended, some required)

- Traffic Analysis Zones (TAZs):
  - a basic spatial unit of analysis representing an area containing similar kinds of land use and commuter travel
  - 5-year CTPP data

- Traffic Analysis Districts:
  - aggregates of similar TAZs
  - 3-year CTPP data
TAZ Delineation Schedule

- **February 2011**: web-based training coordinated with FHWA
- **March - early April 2011**: delivery of software and Census 2010 data and geographic files on a rolling basis.
  - Each state/MPO will get 3 months (literally 90 days) from receipt of the setup file email to delineate their TAZ and TADs and return the files to the Census Bureau.
  - Check the contact list/county delineation responsibilities at: [http://ctpp.transportation.org/Pages/taz.aspx](http://ctpp.transportation.org/Pages/taz.aspx)
- **June - early July 2011**: all files MUST be returned to CB Geography Division within 3 months after the receipt of the TAZ/TAD delineation software and data
- **Bottom line**: March through June of 2011 are the CRITICAL months for MPOs and State DOTs to delineate TAZ and TADs using the software provided by the Census Bureau Geography Division.
- Agencies are NOT required to delineate TAZs or TADs. The default geography for small area tabulation for the CTPP using 2006-2010 ACS records will be census tracts. Even if you do not plan to delineate TAZs, you may want to define TAD by combining 5 or 6 census tracts.
TAZ Delineation Business Rules

Overview

- The software will allow for two levels of TAZs to be defined and saved. These are:
  - **Base TAZs**: These are the smallest TAZs to be defined. Each TAZ represents an area containing similar kinds of land use and commuter travel. These must have an estimated population or worker threshold of 1,200 resident population minimum, and with the ultimate lower limit being at 600. The software would issue warnings in both cases when a threshold is not respected.
  - **Census TADs**: These are aggregates of the Base TAZs and must have an estimated population lower limit of 20,000 residents. The software would issue a warning when the threshold is not respected and reject the TAD. If Base TAZ are not defined for a particular county, Census TADs can be delineated using aggregates of 2010 census tracts or block groups instead.

Approx. one third of TAZs in current Knoxville Model violate proposed thresholds

Info posted to web at: http://www.fhwa.dot.gov/ctpp/tazdbrules.htm
A. Suggested TAZ Minimum Thresholds

For 2010, the base TAZ may be similar to TAZs defined in 2000. The Census Bureau recommends that the minimum resident worker population and workers by place of work level should be approximately 600 persons. This minimum corresponds to the minimum threshold allowable for 2010 Census block groups. However, this threshold is only a guideline or recommendation and is not a requirement. Base TAZs may be defined with fewer than 600 residents or workers; however, as a general rule, data reliability and availability improves as population size or number of workers increases.

- MPOs are not required to define TAZs; these entities are optional. MPOs choosing to not delineate TAZs do have the option of using other geographic entities such as census BGs or tracts for CTPP data tabulation. It will be the responsibility of the State DOT to define TAZs outside of MPO territory. MPO areas where no TAZs are defined will use tracts as default geography for small area tabulation in CTPP 5-year data products.

B. Compactness

It is suggested that TAZs should be compact in nature. Nonetheless, compactness will not preclude delineation because there will be cases where long, narrow commercial corridors are necessary. The Census Geography Division is developing a method for guidelines for determining compactness. Failing to meet this guideline will prompt the software to issue a warning to the user, but will not preclude the TAZ entity from being accepted.

C. Nesting

All TAZs must nest within a County. TAZs do not need to nest within Block Groups, Tracts, Places, MCD or another geographic unit. Furthermore, TAZs have to nest within TADs.

D. Contiguity and Slivers

Each TAZ must be defined as a single polygon with no uncoded sliver polygons between TAZs. Also, no two TAZ entities of the same type can overlap or cover the same area. The purpose is to avoid any small area with a small resident population and worker count that may be inadvertently missed when creating TAZs. Furthermore, all TAZs must be defined as complete polygons.
E. Water and Island Features

When setting a TAZ entity boundary, land and water polygons inside the boundary must be included. This is necessary to eliminate "pockets" within TAZs which can create problems when calculating TAZ "compactness" and determining completeness of coverage. Some islands will have their own unique TAZ. If an island does not have a unique TAZ and is combined with a land TAZ, then the intervening water polygons must be included to create a contiguous TAZ.
F. Overlapping TAZs
Each MPO will be asked to identify the counties within their area of jurisdiction. For purposes of the TAZ delineation program, each county must be assigned to only one MPO. In cases where a jurisdiction is included in more than one MPO, the MPOs will work together under the supervision of the State DOT to define TAZs for their respective MPO areas. If conflict arises between neighboring MPOs, the State DOT(s) and the MPOs in question will work to resolve the issue. If no settlement occurs, the Census Bureau will determine to which MPO to assign the territory.

G. MPO Identification
Every MPO must be uniquely identifiable by the Census Bureau using an 8 character alphanumeric code. The participant will be required to enter the 8 digit MPO identification code already compiled and managed by FHWA. If the code is less than 8 characters, the Census Bureau will add zeroes to the front of the code to fill in up to 8 characters.

H. Uniqueness
Every TAZ entity must be uniquely identifiable using an up-to-8 character alphanumeric identification code. That is, there cannot be duplicate codes for any TAZ entity within a county.

I. Creating TAZ Polygon Features
Base TAZs are built by selecting 2010 census blocks. Census TAZs can not split Census blocks.
Potential similarities between TAZ delineation and US Bureau of the Census Participant Statistical Areas Program (PSAP) from 2009.
Nesting Rules

- 2010 Blocks will make up TAZs
- TAZs will nest with TADs
- TADs can cross Counties and States
- TADs can be built from TAZs, Block Groups or Tracts
Why the hang-up on TAZ size

- ACS is a small sample
- Smaller areas have larger MOES
- Statistical Collapsing
- Confidentiality and Disclosure rules

Big Zones make happy data
Important Concept

TAZs and TADS for Census ACS data do not have to be the same as the TAZs used in your travel forecasting models.

Think of these as:
- Census TAZs or (CTAZs)
- Census TADs or (CTADs)

Travel Forecasting Zones as Planning Zones or Planning Units.

Large Zones are Better for ACS Data.
TAZ Delineation
Future Considerations & Applications

- **TAZ and TAD Delineation should not end at current edge of planning area boundary**
  Each MPO should consider the potential growth for the planning area boundary up to 2020 and delineate TAZs and TADs up to that future boundary – TAZs can always not be used if future growth does not occur.

- Consider adding boundaries where future major new roadways or major new developments are being planned.
  - Have to obey Census Block boundaries however and there may not be any where you need them. This can also be the case for major physical boundaries such as ridgelines.

High level TAZ/TAD delineation process/flow

1. Check the AASHTO website spreadsheets to confirm expected county coverage for 2010 TAZ/TAD delineation. Let us know ASAP if not what you expect.

2. Receive email from GEO TAZ team with customized setup file, and instructions to call for MTPS download username/password. **Mid-March through April**

3. Open setup file and confirm correct county coverage in “CoreCountyCoverage”

4. Call GEO TAZ Team for MTPS download username/password

5. Download the MTPS software, partnership shapefiles (counties specified in setup files), and user documentation from Census Bureau’s website, save to local drive

6. Save setup file to the same local drive folder as the partnership shapefiles (e.g., “TAZlayers”)
High Level TAZ/TAD delineation process/flow (2)

Can divide work among multiple staff members prior to delineation (by editing the setup file (for dividing work on complete counties or administratively assigning county – parts)

- Choose startup methods for TAZs and/or TADs
  - TAZs: 2000 TAZs, 2010 tracts, 2010 block groups, scratch, BEFs
  - TADs (no TAZs): 2010 tracts, 2010 block groups
  - TADs (with TAZs): scratch and BEFs

7 Run setup for the MTPS, and Delineate TAZs and TADs

b Delineate TAZs

c Run TAZ verification checks
d Delineate TADs

e Run TAD verification checks

f "Report Changes" (i.e., create output files)
High Level TAZ/TAD delineation process/flow (3)

8. FTP output files to Census Bureau, follow up with email. Within 90 days from receipt of setup file email: mid-June to early-July.

9. Census Bureau will run verification checks on submissions, and will contact program participant with any problems or issues that do not have clear fixes.
Select both ‘I will be building Traffic Analysis Zones and I will be building Traffic Analysis Districts’

Select one of the TAZ Startup options

Select a method to create TADs
Census Data Product/Info Release Timeline

- 5-Year (2005 – 2009) ACS Data released at Block Group level – December 2010 (available for download at Caliper User Center)
- Population and Housing Unit Counts at Census Block level from 2010 Census – By April 1, 2011
- Summary File 1 – June to Aug. 2011
- New Urban Areas Released – Spring 2012
- 5-Year (2006 – 2010) CTPP Data at TAZ level tentatively set for release in Fall 2012
LEHD – Another Potential Source for JTW Data

- **Longitudinal Employer-Household Dynamics (LEHD)** is an innovative program within the U.S. Census Bureau. The LEHD combines federal and state administrative data on employers and employees with core Census Bureau censuses and surveys while protecting the confidentiality of people and firms that provide the data.

- Uses data from Quarterly Census of Earnings and Wages (QCEW) for job locations and uses a model based on data from Minnesota to assign workers to the job locations.

- Can get worker profiles for small areas such as TAZs and Block Groups with information such as worker counts, age, wages and NAICS industry sector.
  - Can also get estimates of home-to-work flow data.
  - Based on relatively current data.

- Significant data issues have been found that may limit the usefulness of this application at the current time, but it potentially has promise for the future.
  - Appears to suffer from “headquartering” issue to large degree where all employees from multiple worksites are assigned to one headquarters location, i.e. all school employees assigned to school board offices.
LEHD – “On the Map” Online Tool

Knox County Commuter Inflow/Outflow analysis
LEHD – “On the Map” Online Tool

Top 10 Census Tracts for U.T. Campus Workers
Questions?

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mike.conger@knoxtrans.org

David Metzger
Bristol MPO
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dmetzger@bristoltn.org